

Anaphylaxis. Anaphylaxis can occur when mediators are released systemically (e.g., after injection of a drug, after an insect sting). The reaction occurs within minutes and can be life threatening because of bronchial constriction and subsequent airway obstruction and vascular collapse. The target organs affected are seen in Fig. 14-7. Initial symptoms include edema and itching at the site of exposure to the allergen. Shock can occur rapidly and is manifested by rapid, weak pulse; hypotension; dilated pupils; dyspnea; and possibly cyanosis. This is compounded by bronchial edema and angioedema. Death will occur if emergency treatment is not initiated. Some of the important allergens that can cause anaphylactic shock in hypersensitive people are listed in Table 14-9.

Atopic Reactions. An estimated 20% of

Sputum and nasal and bronchial secretions may also be tested for the presence of eosinophils. If asthma is suspected, pulmonary function tests for vital capacity, forced expiratory volume, and maximum midexpiratory flow rates are helpful.

Respiratory System. Ask the patient about any recent or chronic respiratory disease or infections. Elective surgery may need to be postponed if the person has an upper respiratory tract infection. Upper airway infections increase the risk of bronchospasm, laryngospasm, decreased O₂ saturation, and problems with respiratory secretions. Also report a patient's history of dyspnea at rest or with exertion, coughing (dry or productive), or hemoptysis (coughing blood) to the ACP and the surgeon.

If a patient has a history of asthma, inquire about the use of inhaled or oral corticosteroids and bronchodilators, as well as the frequency and triggers of asthma attacks. The patient with a history of COPD is at high risk for postoperative pulmonary complications, including hypoxemia and atelectasis. Encourage the patient who smokes to stop at least 6 weeks preoperatively to decrease the risk of intraoperative and postoperative respiratory complications. The greater the patient's pack-years of smoking (packs smoked per day times years), the

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Depending on the patient's history and physical examination, baseline pulmonary function tests and arterial blood gases may be ordered preoperatively.

Neurologic System. Preoperative

Respiratory System

- Identify acute or chronic problems. Note the presence of infection, chronic obstructive pulmonary disease, or asthma. Note use of CPAP machine.
- Assess history of smoking, including the time since the last cigarette and the number of pack-years.
- Determine baseline respiratory rate and rhythm and regularity of pattern.
- Observe for cough, dyspnea, and use of accessory muscles of respiration.
- Auscultate lungs for normal and adventitious breath sounds.

Dissociative Anesthesia. Dissociative anesthesia interrupts associative brain pathways while blocking sensory pathways. The patient may appear catatonic, is amnesic, and experiences profound analgesia that lasts into the postoperative period. Ketamine (Ketalar) is a commonly administered dissociative anesthetic. Ketamine (administered IV or intramuscularly) is a potent analgesic and amnesic. It is used in asthmatic patients undergoing surgery because it promotes bronchodilation and in trauma patients requiring surgery because it increases heart rate and helps maintain cardiac output. Because ketamine is a **phenylcyclohexylpiperidine** (PCP) derivative, the drug may cause hallucinations and nightmares, greatly limiting its usefulness. Concurrent use of **midazolam** (Versed) can reduce or eliminate hallucinations associated with ketamine. Provide a quiet, unhurried environment in the PACU for all patients receiving dissociative anesthesia.⁴⁴

Dissociative Anesthetic

ketamine (Ketalar) Can be administered IV or IM. Potent **analgesic** and **amnesic**.

May cause hallucinations and nightmares, increased intracranial and intraocular pressure, ↑ heart rate, ↑ blood pressure.

Anticipate administration of a benzodiazepine if agitation and hallucinations occur. Calm, quiet environment is essential in postoperative care.

In contrast to inspiration, expiration is passive. **Elastic recoil** is the tendency for the lungs to relax after being stretched or expanded. The elasticity of lung tissue is due to the elastin fibers found in the alveolar walls and surrounding the bronchioles and capillaries. The elastic recoil of the chest wall and lungs allows the chest to passively decrease in volume. Intrathoracic pressure rises, causing air to move out of the lungs

Asthma affects an estimated 18.8 million adult Americans. Among adults, women are 62% more likely to have asthma than men. Asthma is a public health concern, with more than million lost workdays in adults. However, the good news is after a long period of an increasing incidence of asthma, mortality and use of health care services are continuing plateau and/or decrease. Despite the decline in the number deaths from asthma over the past 10 years, more than 3300

people still die from asthma yearly.¹

Risk Factors for Asthma and Triggers of Asthma Attacks

Risk factors for asthma and triggers of asthma attacks can be related to the patient (e.g., genetic factors) or the environment (e.g., pollen) (Table 29-1). Male gender is a risk factor for asthma in children (but not adults). Obesity is also a risk factor for asthma.⁴ Other factors and triggers are discussed in section.

Genetics. Asthma has a component that is inherited, but the genetics are complex. Numerous genes may be involved in the development of asthma and a person's response to various asthma medications.^{3,4} Atopy, the genetic predisposition to develop an allergic (immunoglobulin E [IgE]-mediated) response to common allergens, is a major risk factor for asthma.

variations in airflow over time, usually with normal lung function between exacerbations, whereas the limitation in expiratory airflow in the patient with COPD is generally more constant. The pathology of asthma and the response to therapy differ from those associated with COPD. However, the patient with a diagnosis of obstructive pulmonary disease may have features of both asthma and COPD. Patients with asthma who have less responsive reversible airflow obstruction are difficult to distinguish from COPD patients.

Cystic fibrosis, another form of obstructive pulmonary disease, is a genetic disorder that produces airway obstruction because of changes in exocrine glandular secretions, resulting in increased mucus production. Bronchiectasis is an obstructive disease characterized by dilated bronchioles. It most frequently results from untreated or poorly treated pulmonary infections that cause an increase in sputum production.

ASTHMA

Asthma is a chronic inflammatory disorder of the airways. The chronic inflammation leads to recurrent episodes of wheezing, breathlessness, chest tightness, and cough, particularly at night or in the early morning. These episodes are associated with widespread but variable ~~airflow obstruction~~ that is usually reversible, either spontaneously or with treatment. The clinical course of asthma is unpredictable, ranging from periods of adequate control to exacerbations with poor control of symptoms.³

Asthma

Men Women

- Before puberty, more boys are affected than girls.
- After puberty and into adulthood, more women are affected than men.
- Women who are admitted to the emergency department are more likely to need hospitalization than men.
- Death rate from asthma is greater in women than in men.

Obstructive Pulmonary Diseases

Asthma

- Asthma prevalence rates are more than 38% higher among African Americans than whites.
- Puerto Ricans have higher asthma prevalence rates and age-adjusted death rates than all other racial and ethnic subgroups.
- Female African Americans have the highest mortality rates from asthma among all ethnic/gender groups.

Chronic Obstructive Pulmonary Disease (COPD)

- Whites have the highest incidence of COPD in spite of higher rates of smoking among other ethnic groups.
- Hispanics have lower death rates related to COPD than other ethnic groups.

Cystic Fibrosis

- Whites have the highest incidence of cystic fibrosis.
- Cystic fibrosis is uncommon among African Americans, Hispanics, and Asian Americans.

Allergen inhalation

- Animal dander (e.g., cats, mice, guinea pigs)
- House dust mite
- Cockroaches
- Pollens
- Molds

Air pollutants

- Exhaust fumes
- Perfumes
- Oxidants
- Sulfur dioxides
- Cigarette smoke
- Aerosol sprays

Inflammation and infection

- Viral upper respiratory tract infection
- Sinusitis, allergic rhinitis

Drugs

- Aspirin
- Nonsteroidal antiinflammatory drugs
- β -Adrenergic blockers

Occupational exposure

- Agriculture, farming
- Paints, solvents
- Laundry detergents
- Metal salts
- Wood and vegetable dusts
- Industrial chemicals and plastics
- Pharmaceutical agents

Food additives

- Sulfites (bisulfites and metabisulfites)
- Beer, wine, dried fruit, shrimp, processed potatoes
- Monosodium glutamate
- Tartrazine

Other factors

- Exercise and cold, dry air
- Stress
- Hormones, menses
- Gastroesophageal reflux disease (GERD)

Immune activation

(IL-4, IgE production)

Mast cell degranulation

Inflammatory mediators

Vasodilation

Increased capillary permeability

Cellular infiltration

(neutrophils, lymphocytes, eosinophils)

Neuropeptides released

with autonomic
nervous system effects
PATHOPHYSIOLOGY MAP

FIG. 29-1 Pathophysiology of asthma. IL, Interleukin.

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Every interaction with a patient and a caregiver is a potential teachable moment. On any given day, more informal opportunities to teach will occur than formal opportunities. Take advantage of all of these moments. For example, when you teach a patient with asthma how to use a peak flow meter, you do not require a formal teaching plan. However, when your patient has a specific learning need about health promotion or management of a health problem, you should develop a teaching plan. A teaching plan includes (1) assessment of the patient's ability, need, and readiness to learn; and (2) identification of problems that can be resolved with teaching. Then develop goals with the patient, provide teaching interventions, and evaluate the effectiveness of the teaching.